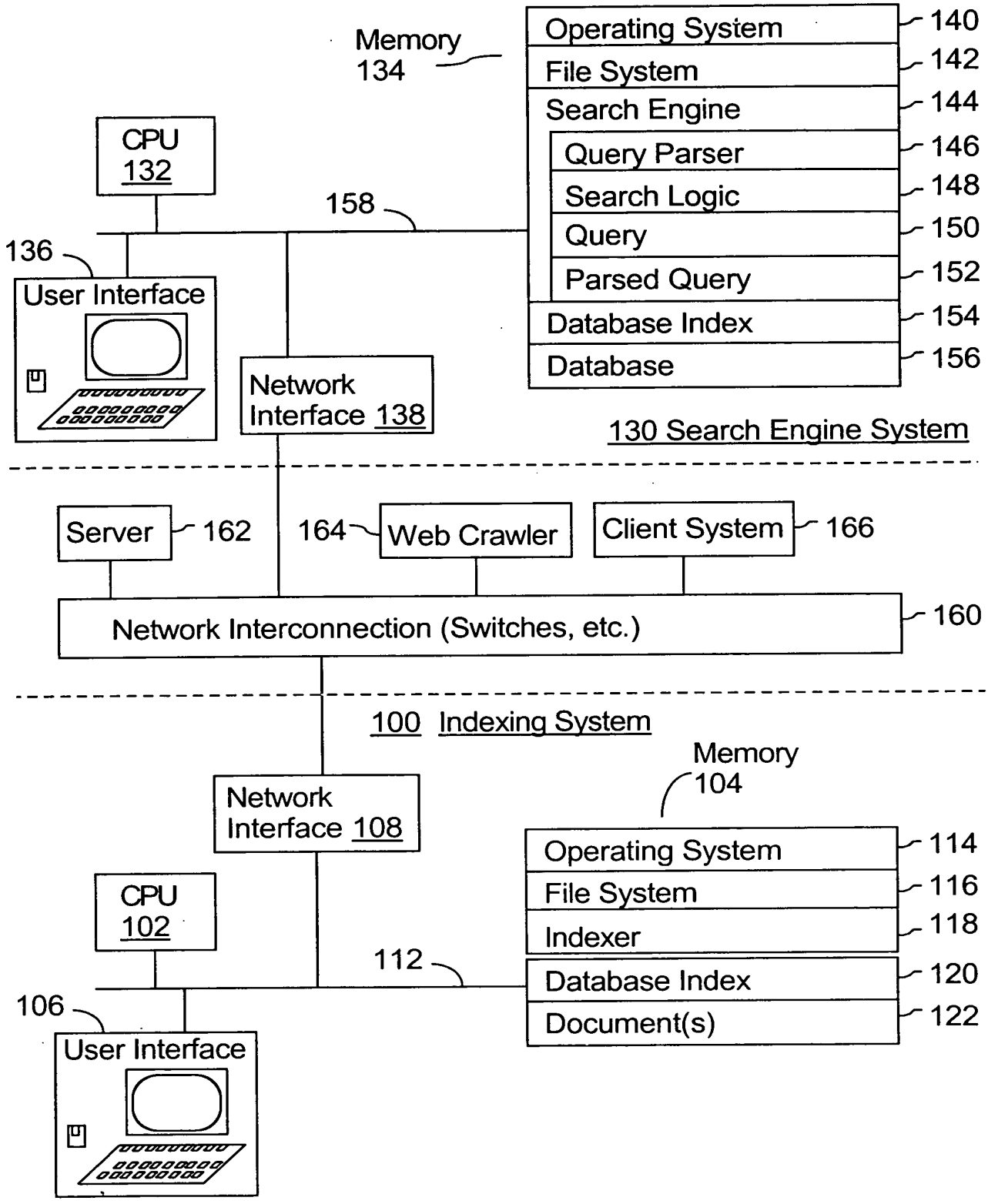
Memory
134
Operating System
140
File System
142
Search Engine
144
Query Parser
146
Search Logic
148
Query
150
Parsed Query
152
Database Index
154
Database
156
CPU
132
158
136
User Interface
Network
Interface 138
130 Search Engine System
Server
162
164
Web Crawler
Client System
166
Network Interconnection (Switches, etc.)
160
100 Indexing System
Memory
104
Network
Interface 108
Operating System
114
File System
116
Indexer
118
CPU
102
112
Database Index
120
Document(s)
122
106
User Interface

FIG. 1

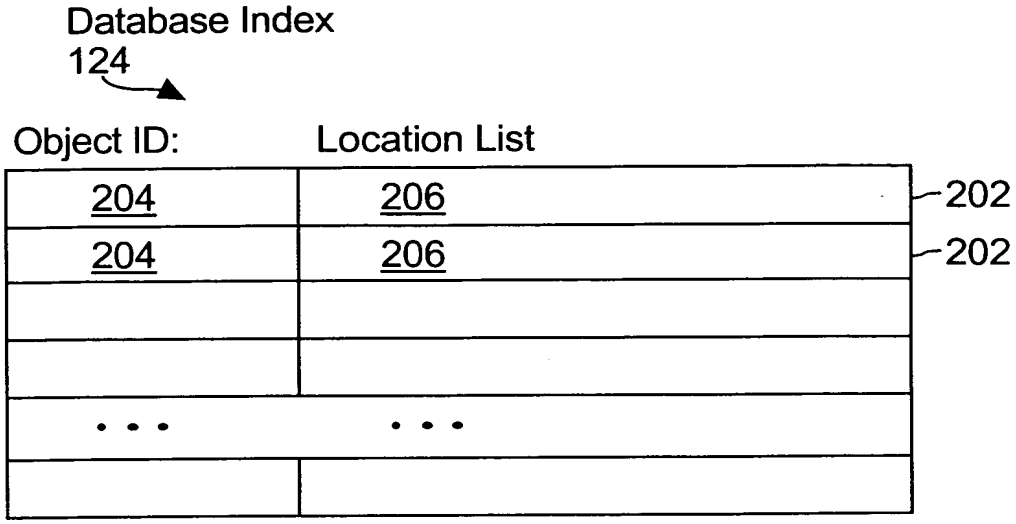

FIG. 2A

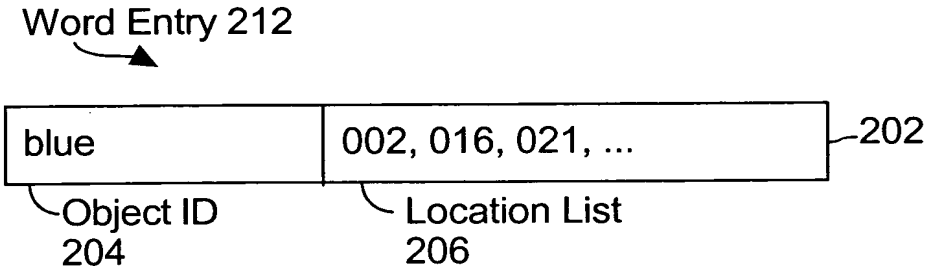

FIG. 2B

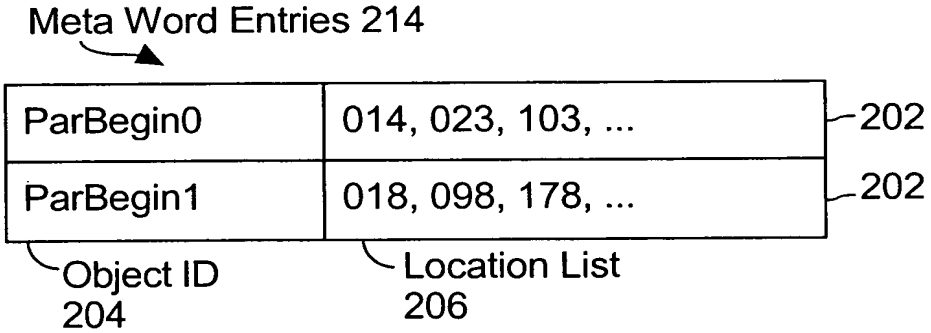

FIG. 2C

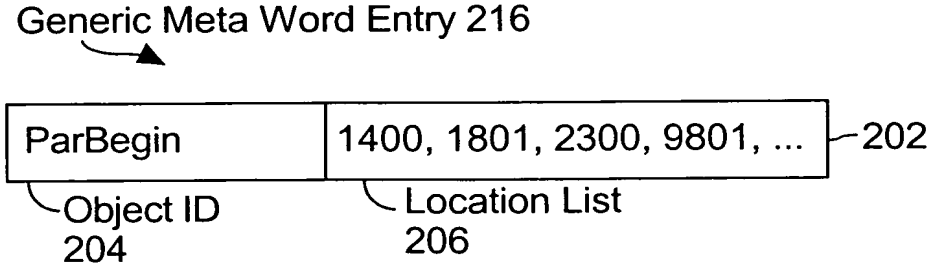

FIG. 2D

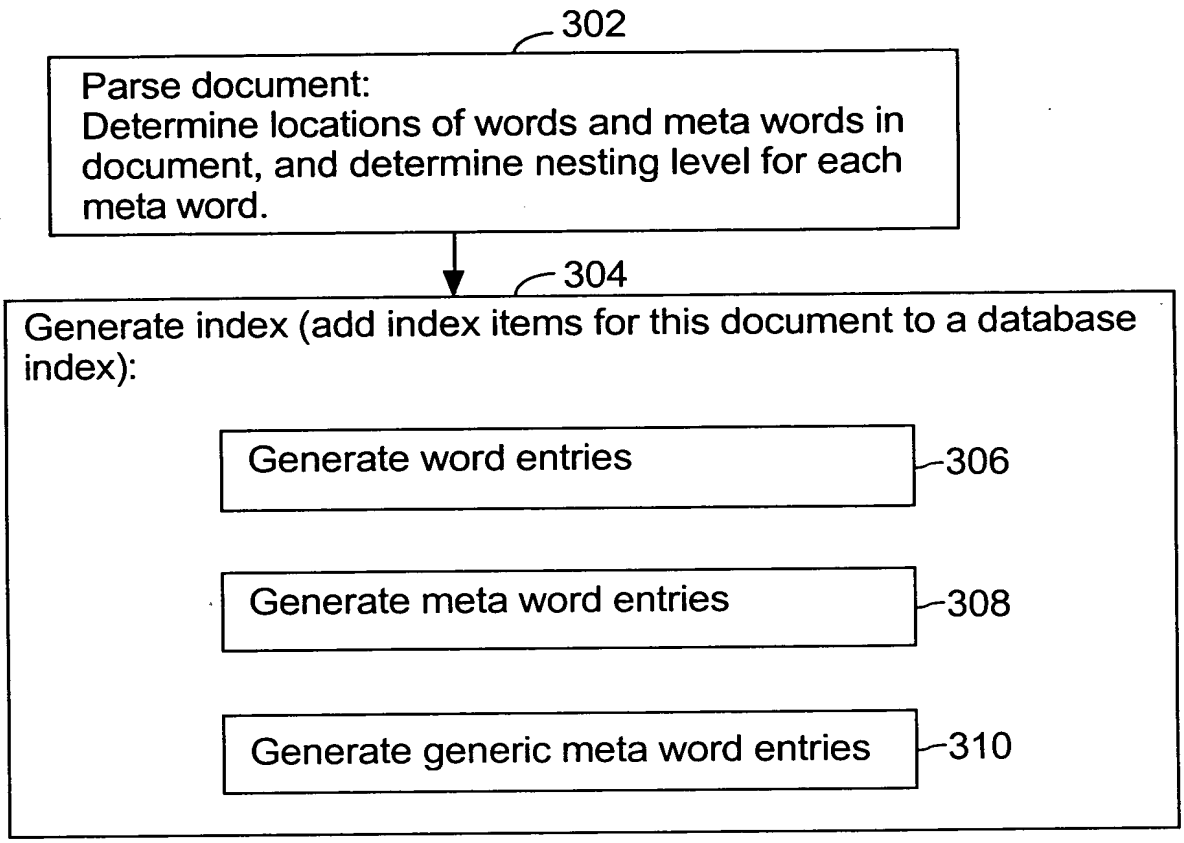
302
Parse document:
Determine locations of words and meta words in document, and determine nesting level for each meta word.
304
Generate index (add index items for this document to a database index):
Generate word entries
306
Generate meta word entries
308
Generate generic meta word entries
310

FIG. 3

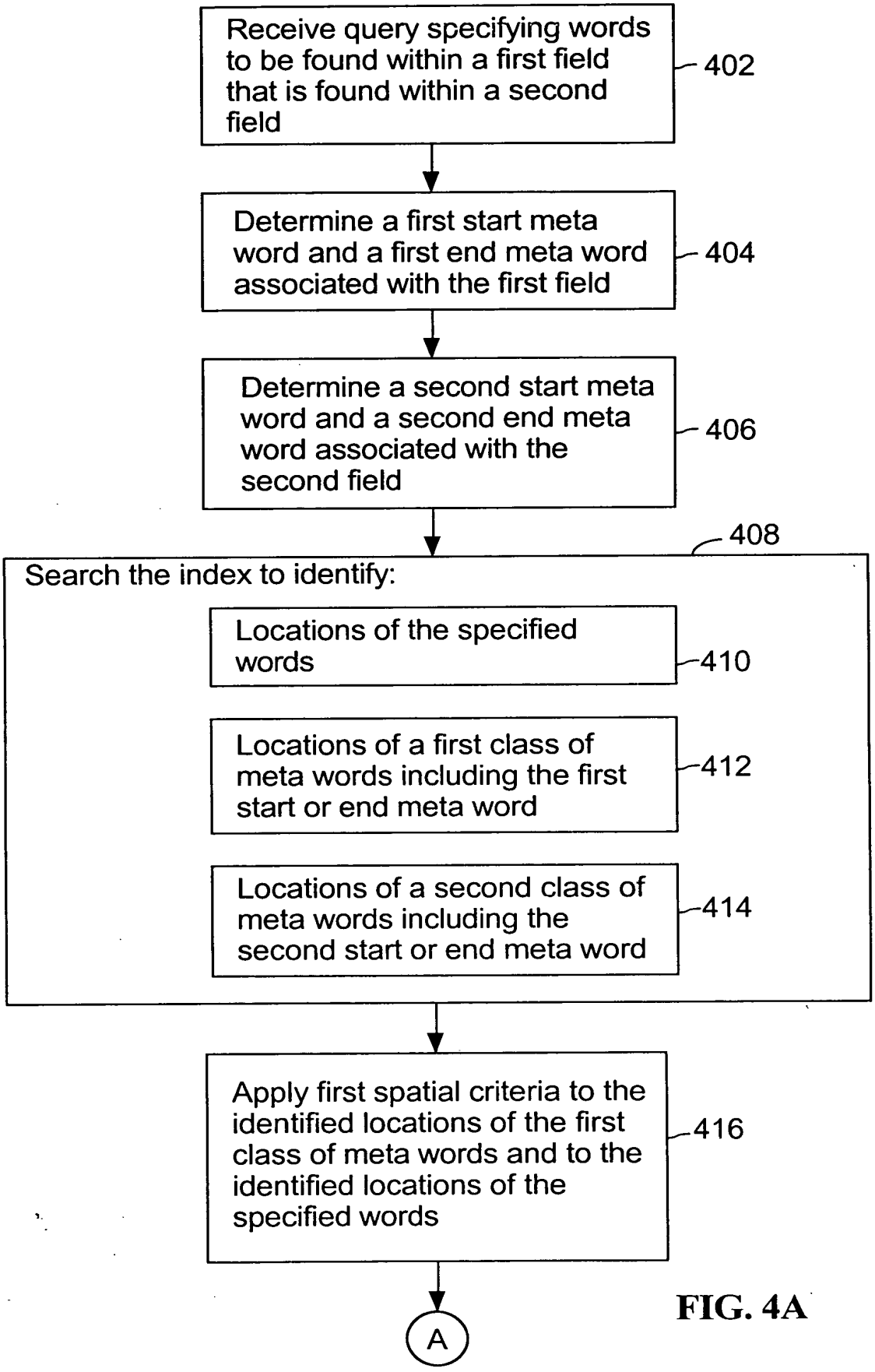
Receive query specifying words to be found within a first field that is found within a second field
402
Determine a first start meta word and a first end meta word associated with the first field
404
Determine a second start meta word and a second end meta word associated with the second field
406
408
Search the index to identify:
Locations of the specified words
410
Locations of a first class of meta words including the first start or end meta word
412
Locations of a second class of meta words including the second start or end meta word
414
Apply first spatial criteria to the identified locations of the first class of meta words and to the identified locations of the specified words
416
A

FIG. 4A

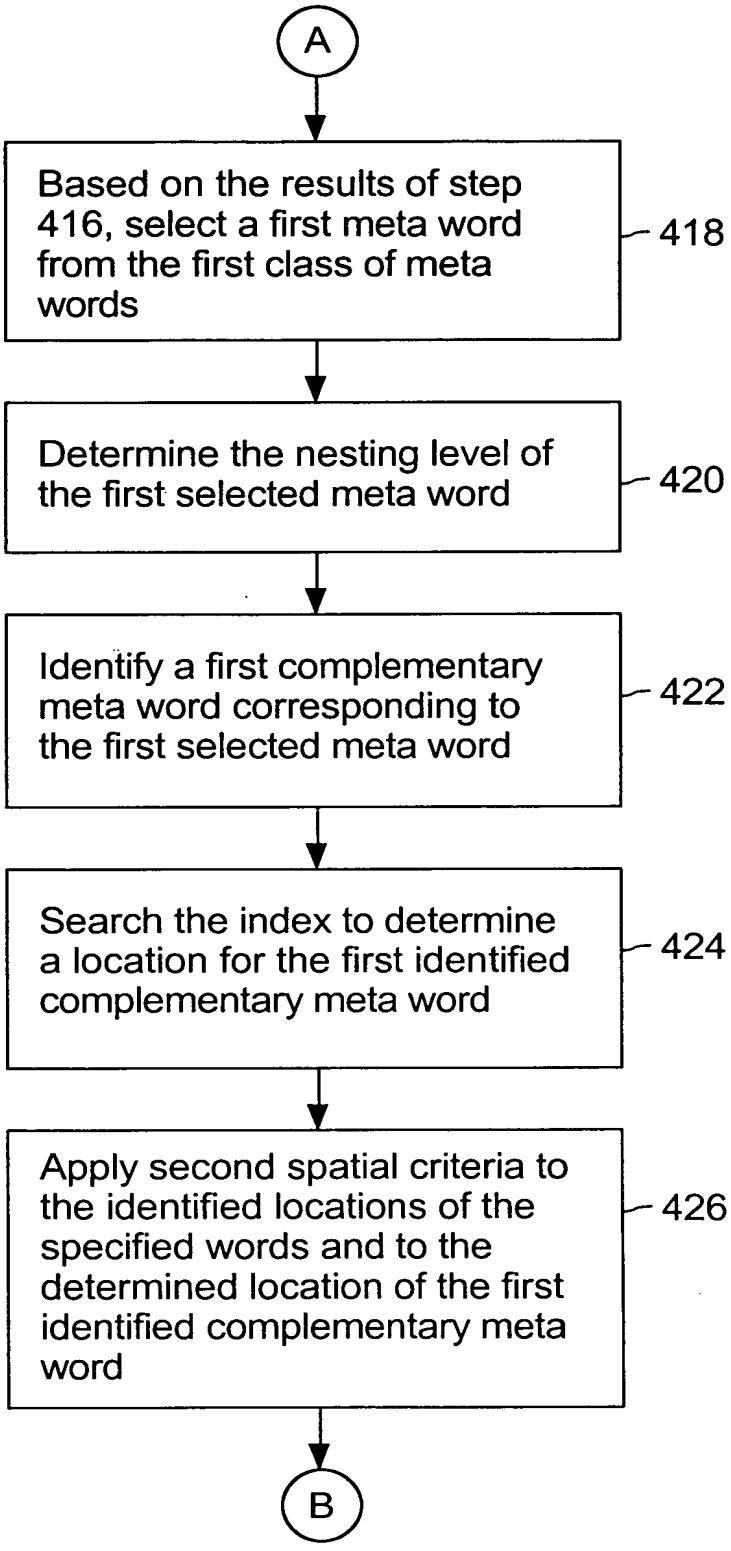
A
Based on the results of step 416, select a first meta word from the first class of meta words
418
Determine the nesting level of the first selected meta word
420
Identify a first complementary meta word corresponding to the first selected meta word
422
Search the index to determine a location for the first identified complementary meta word
424
Apply second spatial criteria to the identified locations of the specified words and to the determined location of the first identified complementary meta word
426
B

FIG. 4B

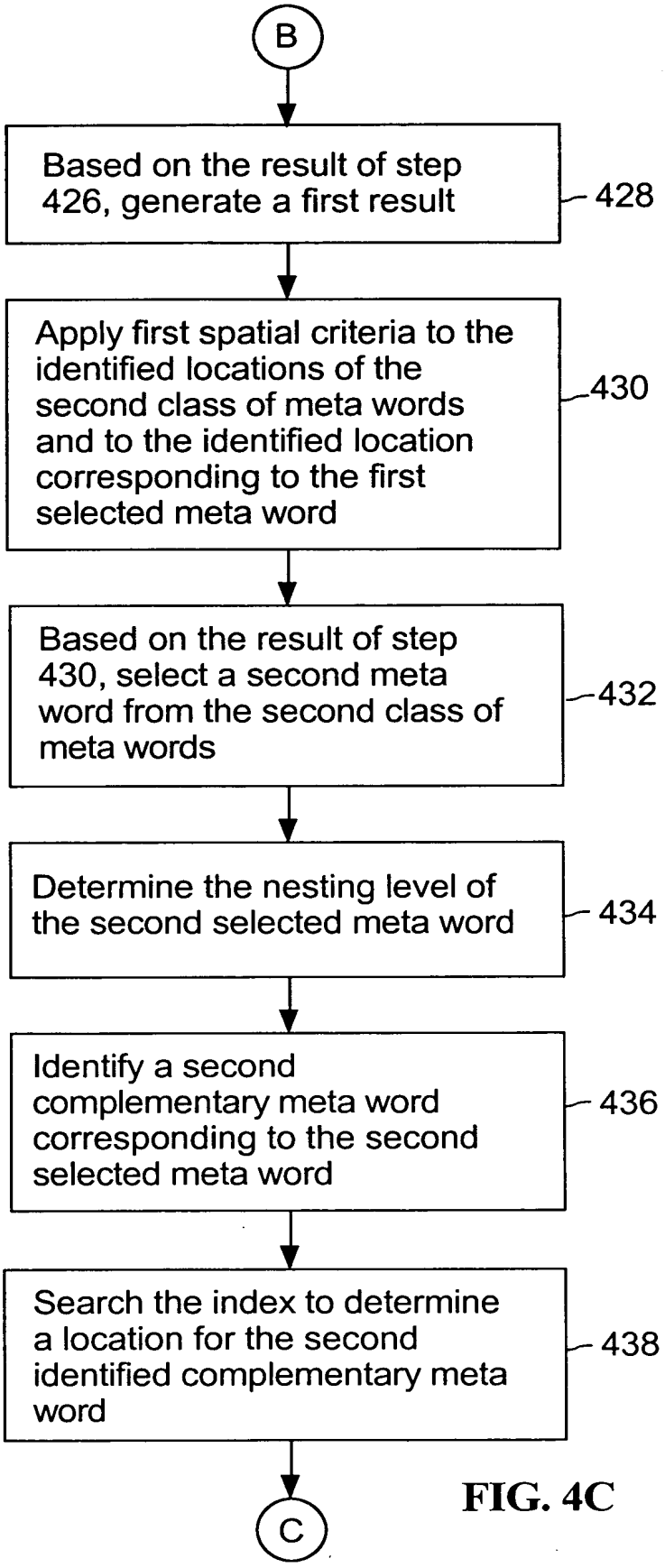

FIG. 4C

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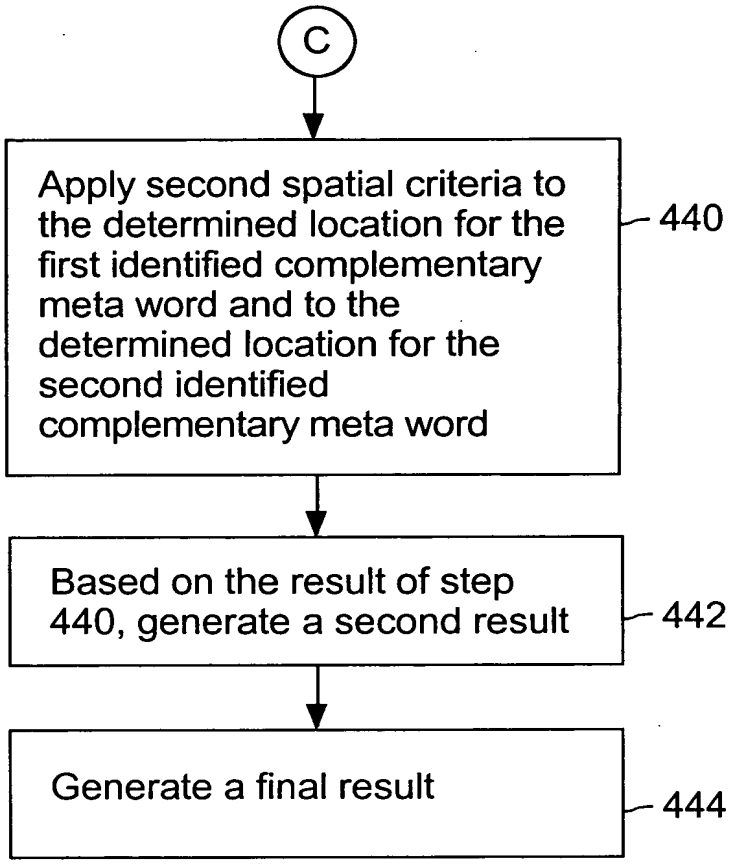
C
Apply second spatial criteria to the determined location for the first identified complementary meta word and to the determined location for the second identified complementary meta word
440
Based on the result of step 440, generate a second result
442
Generate a final result
444

FIG. 4D

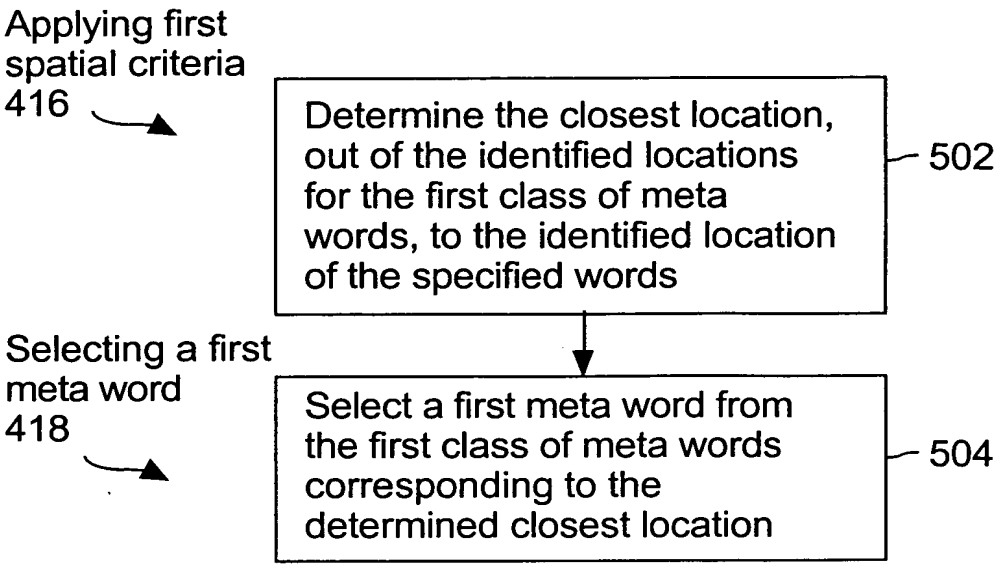
Applying first spatial criteria 416
Determine the closest location, out of the identified locations for the first class of meta words, to the identified location of the specified words
502
Selecting a first meta word 418
Select a first meta word from the first class of meta words corresponding to the determined closest location
504

FIG. 5A

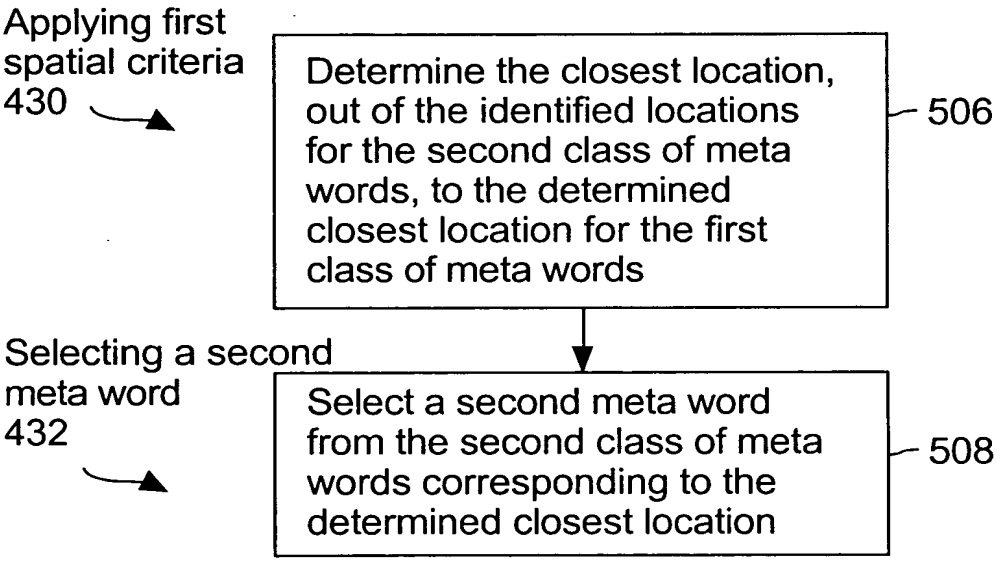
Applying first spatial criteria 430
Determine the closest location, out of the identified locations for the second class of meta words, to the determined closest location for the first class of meta words
506
Selecting a second meta word 432
Select a second meta word from the second class of meta words corresponding to the determined closest location
508

FIG. 5B

Searching the index to determine a location for the first identified complementary meta word

424

Search the index to determine a closest complementary location of the first identified complementary meta word with respect to the identified location corresponding to the first selected meta word — 602

FIG. 6A

Searching the index to determine a location for the second identified complementary meta word

438

Search the index to determine a closest complementary location of the second identified complementary word with respect to the identified location corresponding to the second selected meta word — 604

FIG. 6B

Applying second spatial criteria

426

Determine whether the identified location of the specified words falls between:

a) the determined location for the first identified complementary meta word, and

b) the determined closest location of the first class of meta words — 702

FIG. 7A

Applying second spatial criteria

440

Determine whether the determined location for the first identified complementary meta word falls between:

a) the determined location for the second identified complementary meta word, and

b) the identified location of the specified words — 704

FIG. 7B